



DRAFT - CUPS Software Administrators Manual

CUPS-SAM-1.0.0

Easy Software Products
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Preface

This software administrators manual provides printer administration information for the Common UNIX Printing System ("CUPS") Version 1.0.0.

System Overview

The Common UNIX Printing System provides a portable printing layer for UNIX® operating systems. It has been developed by Easy Software Products to promote a standard printing solution for all UNIX vendors and users. CUPS provides the System V and Berkeley command-line interfaces.

CUPS uses the Internet Printing Protocol (IETF-IPP) as the basis for managing print jobs and queues. The Line Printer Daemon (LPD, RFC1179), Server Message Block (SMB), and AppSocket protocols are also supported with reduced functionality.

CUPS adds network printer browsing and PostScript Printer Description ("PPD")-based printing options to support real world applications under UNIX.

Document Overview

This software administrators manual is organized into the following sections:

- 1 - Printing System Overview
- 2 - Building and Installing CUPS

- 3 - Printer Queue Management
- 4 - Printing System Management

1 - Printing System Overview

This chapter provides an overview of how the Common UNIX Printing System works.

The Printing Problem

For years *the printing problem* has plagued UNIX®. Unlike Microsoft® Windows® or MacOS, UNIX has no standard interface or system in place for supporting printers. Among the solutions previously available, the Berkeley and System V printing systems are the most prevalent.

These printing systems support line printers (text only) or PostScript printers (text and graphics), and with some coaxing they can be made to support a full range of printers and file formats. However, because each variant of the UNIX operating system uses a different printing system than the next, developing printer drivers for a wide range of printers is extremely difficult. That combined with the limited volume of customers for each UNIX variant has forced most printer vendors to give up supporting UNIX entirely.

The Common UNIX Printing System, or CUPS, is designed to eliminate *the printing problem*. One common printing system can be used by all UNIX variants to support the printing needs of users. Printer vendors can use its modular filter interface to develop a single driver program that supports a wide range of file formats with little or no effort. Since CUPS provides both the System V and Berkeley printing commands, users (and applications) can reap the benefits of this new technology with no changes.

The Technology

CUPS is based upon an emerging Internet standard called the Internet Printing Protocol, or IPP. IPP has been embraced by dozens of printer and printer server manufacturers, and will be supported by the next Microsoft Windows operating system.

IPP defines a standard protocol for printing as well as managing print jobs and printer options like media size, resolution, and so forth. Like all IP-based protocols, IPP can be used locally or over the Internet to printers hundreds or thousands of miles away. Unlike other protocols, however, IPP also supports access control, authentication, and encryption, making it a much more secure printing solution than older ones.

IPP is layered on top of the Hyper-Text Transport Protocol, or HTTP, which is the basis of web servers on the Internet. This allows the user to view documentation and status information on a printer or server using their web browser.

CUPS provides a complete IPP/1.0-based printing system that provides Basic authentication and domain or IP-based access control. Digest authentication and TLS encryption will be available in future versions of CUPS.

Filters

Filters allow a user or application to print many types of files without extra effort. Print jobs sent to a CUPS server are filtered before sending them to a printer. Some filters convert job files to different formats that the printer can understand. Others perform page selection and ordering tasks. *Backend* filters perform the most important task of all - they send the filtered print data to the printer.

CUPS provides filters for printing many types of image files, HP-GL/2 files, PDF files, and text files. CUPS also supplies PostScript and image file Raster Image Processors, or RIPs, that convert PostScript or image files into bitmaps that can be sent to a raster printer.

CUPS provides backends for printing over parallel and serial ports, and over the network via the JetDirect (AppSocket), Server Message Block, and Line Printer Daemon protocols.

Printer Drivers

Printer drivers in CUPS consist of one or more filters specific to a printer. CUPS includes a sample printer driver for Hewlett-Packard LaserJet and DeskJet printers. While this driver does not generate optimal output for different printer models, it does demonstrate how you can write your own printer drivers and incorporate them into CUPS.

2 - Building and Installing CUPS

This chapter shows how to build and install the Common UNIX Printing System.

Requirements

You'll need an ANSI C compiler to build CUPS on your system. As its name implies, CUPS is designed to run on the UNIX operating system, however the CUPS interface library and most of the filters and backends supplied with CUPS should also run under Microsoft® Windows®.

For the image file filters and PostScript RIP, you'll need the JPEG, PNG, TIFF, and ZLIB libraries. CUPS will build without these, but with reduced functionality. Easy Software Products maintains a mirror of the current versions of these libraries at:

<ftp://ftp.easysw.com/pub/libraries>

If you make changes to the man pages you'll need GNU groff or another nroff-like package. GNU groff is available from:

<ftp://ftp.gnu.org/pub/groff>

The documentation is formatted using the HTMLDOC software. If you need to make changes you can get the

HTMLDOC software from:

<http://www.easysw.com/htmldoc>

Compiling CUPS

CUPS uses GNU autoconf to configure the makefiles and source code for your system. To configure CUPS for your system type:

```
% ./configure ENTER
```

The default installation will put the CUPS software in the `/usr` and `/var` directories on your system, which will overwrite any existing printing commands on your system. To install the CUPS software in another location use the `--prefix` option:

```
% ./configure --prefix=/usr/local ENTER
```

If the PNG, JPEG, TIFF, and ZLIB libraries are not installed in a system default location (typically `/usr/include` and `/usr/lib`) you'll need to set the `CFLAGS` and `LDFLAGS` environment variables prior to running configure:

```
% setenv CFLAGS "-I/some/directory"
% setenv LDFLAGS "-L/some/directory"
% ./configure ... ENTER
```

Once you have configured things, just type:

```
% make ENTER
```

to build the software.

Installing the Software

To install the software type:

```
% make install ENTER
```

Running the Software

Once you have installed the software you can start the CUPS daemon by typing:

```
% /usr/sbin/cupsd & ENTER
```

3 - Printer Queue Management

This chapter discusses how to add, modify, and delete print queues on your system.

The lpadmin Command

The `lpadmin` command allows you to perform most printer administration tasks from the command-line. Since `lpadmin` is also a System V printing system command, it is located in the `/usr/lib` directory instead of a more common one like `/usr/bin` or `/usr/sbin`.

Adding and Modifying Printers

To add a printer to CUPS you simply run the `lpadmin` command with the `"-p"` option:

```
% /usr/lib/lpadmin -pprinter -vdevice -Pppd ENTER
```

The *printer* name can be up to 127 letters, digits, hyphens, and underscores. Unlike other printing systems, the printer name in CUPS is *not* case-sensitive, so you can't add two printers named `LaserJet` and `laserjet`.

The *device* argument specifies the device URI or filename for the printer. The following devices are

supported in a basic installation of CUPS:

file:/dev/filename

/dev/filename

Sends all output to the specified file.

ipp://hostname[:port]/resource

Sends all output to the specified IPP printer or server. The *port* parameter defaults to 631.

lpd://hostname/queue

Sends all output to the specified LPD printer queue.

parallel:/dev/filename

Sends all output to the specified parallel port device.

serial:/dev/filename[?options]

Sends all output to the specified serial port device. The *options* can be any of the following separated by the plus (+) character:

baud=rate - Sets the baud rate for the device.

bits=7 or 8 - Sets the number of data bits.

parity=even - Sets even parity checking.

parity=odd - Sets odd parity checking.

parity=none - Turns parity checking off.

socket://hostname[:port]

Sends all output to the specified printer using the AppSocket protocol. The *port* parameter defaults to 9100.

The *ppd* argument specifies the PostScript Printer Description file to use for this printer. Many options (such as media size, etc.) will not be available if you omit this part of the `lpadmin` command.

Removing Printers

To remove a printer to CUPS you simply run the `lpadmin` command with the "-x" option:

```
% /usr/lib/lpadmin -xprinter ENTER
```

Printer Classes

CUPS allows you to group similar printers in a *printer class*. When a user sends a print job to a class, the job will be processed by the first available printer in that class.

To add a printer to a class you simply run the `lpadmin` command with the `-p` and `-c` options:

```
% /usr/lib/lpadmin -ppprinter -cclass ENTER
```

The *class* is created automatically if it doesn't exist. To remove a class just use the `-x` option:

```
% /usr/lib/lpadmin -xcclass ENTER
```

Setting the Default Printer

To set the default printer or class simply run the `lpadmin` command with the `-d` option:

```
% /usr/lib/lpadmin -dddestination ENTER
```

The *destination* argument is the name of the printer or class.

4 - Printing System Management

Network Configuration

Printer Security

Printer Accounting

Adding File Types

Before you run CUPS for the first time you'll need to edit the CUPS configuration files which are normally located in `/var/cups/conf`.

The `cupsd.conf` file configures all of the "global" server settings and access control. The default settings are usually appropriate for most environments.

The `printers.conf` file configures each printer queue. You'll need to add a listing for each printer on your system.

The `classes.conf` file configures each printer class. You'll need to add a listing for each printer class you want.

The `mime.types` file defines all of the recognized file types. You don't normally have to edit this file.

The `mime.convs` file defines all of the file conversion filters. You don't normally have to edit this file.

In addition to the files in the `/var/cups/conf` directory, you'll also need to copy PPD files for each printer to the `/var/cups/ppd` directory. If you don't have a PPD file for your printer, the drivers will still work, just with reduced functionality.

Using the Software

Once you have installed the software, you can use the normal `lp` or `lpr` commands to print jobs. If you installed the software under `/usr` then you shouldn't have to reconfigure any applications to recognize the new printing system.

One of the advantages of CUPS is that you don't always have to send PostScript or Text files to your printers. If you have a JPEG file, you can just type `"lp filename.jpg"` and CUPS will handle converting it for you!

You can monitor the status of jobs via the `lpstat` command or with your web browser by pointing it at `"http://localhost:631"`.